

PATENT ABSTRACTS OF JAPAN

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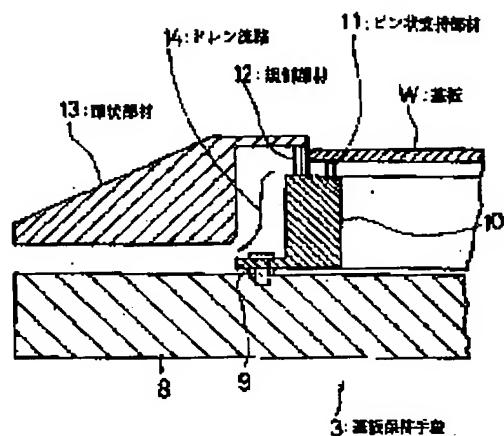
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(54) ROTATING TYPE BOARD PROCESSING DEVICE

(57)Abstract:

PURPOSE: To provide a device which generates no chucking marks on the board rear face and improve the cleanliness of the end face and rear face of the board without damaging the uniformity of coating.

CONSTITUTION: A board retaining means 3 is provided with a pin-shaped support component 11 and a regulating component 12, and the upper end of the pin-shaped support component 11 is brought into point contact with the rear face of a board W to support the board W, and also the regulating component 12 is brought into point contact with the outer peripheral end edge of the board W in the supporting state to regulate the position of the board W in the horizontal direction, and the board W is retained rotatably around the axial center in the vertical direction. A ring component 13 is provided in the manner of covering the outer peripheral edge of the board all over the whole periphery on the outside of the horizontal direction of the regulating component 12, and the upper face of the ring component 13 is constituted flat, and a drain channel 14 heading downward in the vertical direction between the ring component 13 and the regulating component 12 is formed, and while resistance is provided to air flow generated by the centrifugal force, dan the drain flowing from the board W by the centrifugal force can be discharged.



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JAPANESE [JP,08-131929,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION
TECHNICAL PROBLEM MEANS OPERATION EXAMPLE DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

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CLAIMS**[Claim(s)]**

[Claim 1] A rotating type substrate processor equipped with a substrate maintenance means characterized by providing the following to hold a substrate and to rotate by the circumference of an axis of the direction of a vertical, and a processing liquid supply means to supply processing liquid to said substrate held at said substrate maintenance means Pin-like supporter material which carries out point contact of said substrate to the rear face, and supports it to it for said substrate maintenance means It has specification-part material which carries out point contact to the periphery edge of said substrate of a support condition by said pin-like supporter material, and regulates a horizontal location of said substrate, and while having the flat upper surface, a periphery edge of said substrate is crossed to the perimeter on the horizontal outside of said specification-part material, and it is a wrap annular member. Drain passage which makes a drain poured according to a centrifugal force from said substrate go to the direction lower part of a vertical

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention A semiconductor wafer, the glass substrate for photo masks, the glass substrate for liquid crystal displays, For applying spreading liquid, such as resist liquid, to substrates, such as a substrate for optical disks, and supplying a solvent on the periphery edge of a substrate, and washing, performing the so-called edge rinse, etc. It is related with the rotating type substrate processor equipped with a substrate maintenance means to hold a substrate and to rotate by the circumference of the axis of the direction of a vertical, and a processing liquid supply means to supply processing liquid to said substrate held at said substrate maintenance means.

[0002]

[Description of the Prior Art] As this kind of a rotating type substrate processor, conventionally, generally, it is constituted so that a substrate may be held by vacuum adsorption. However, it originated in that strong adsorption power, and the remains of a chuck remained in the substrate rear face, these remains of a chuck joined contamination from the before process, produced gap in the height on the front face of a substrate, and there was a problem which generates the focal abnormalities at the time of exposure. Moreover, when the particle adhering to the rear face of a substrate broke away and it held in a cassette, there was a problem of polluting the front face of the substrate held in the bottom, or having transferred to a substrate transport device and polluting other substrates.

[0003] Then, in order to avoid the above problems, what was constituted so that a substrate might be supported only on the periphery veranda is proposed, such as preparing the annular member which prepares the support pin which supports the rear face of a substrate, and the regulation pin which regulates a horizontal location in contact with the end face of a substrate in the periphery veranda of a substrate, or supports the periphery edge of a substrate with a bonnet over the perimeter.

[0004]

[Problem(s) to be Solved by the Invention] However, when constituted from a support pin and a regulation pin, the turbulent flow occurred by the pin with the revolution, and there was a defect to which spreading homogeneity falls in the perimeter of a pin. although an annular member is prepared on the other hand -- a case -- spreading homogeneity -- excelling -- **** -- although -- the end face and rear face of a substrate -- dirt -- easy -- moreover, even if it washed them, a penetrant remover tended to remain, and there was a defect to which the cleanliness of the end face of a substrate or a rear face falls.

[0005] This invention aims at the ability to be made to make high cleanliness of the end face of a substrate, or a rear face, without spoiling spreading homogeneity, being made in view of such a situation and not making a substrate rear face produce the remains of a chuck.

[0006]

[Means for Solving the Problem] A substrate maintenance means to hold a substrate and to rotate by the circumference of an axis of the direction of a vertical in order that this invention may attain the above objects, In a rotating type substrate processor which equipped a substrate held at the substrate maintenance means with a processing liquid supply means to supply processing liquid Pin-like supporter material which carries out point contact of the substrate to the rear face, and supports it to it for a substrate maintenance means, It has specification-part material which carries out point contact to the periphery edge of a substrate of a support condition by pin-like supporter material, and regulates a horizontal location of a substrate. And while having the flat upper surface, drain passage which makes a drain poured according to a centrifugal force from a wrap annular member and a substrate over the

perimeter in a periphery edge of a substrate go to the direction lower part of a vertical has and consists of horizontal outsides of specification-part material.

[0007]

[Function] According to the configuration of the rotating type substrate processor of this invention, a substrate can be held and rotated by carrying out point contact of the rear face of a substrate, and the specification-part material for pin-like supporter material to the periphery edge of a substrate, respectively. And although a bonnet, and processing liquid and the drain of a case of spreading liquid or edge rinse which are called a solvent enter the periphery edge of a substrate between the periphery edge of a substrate, and an annular member over the perimeter in the annular member which made the upper surface flat, they can be passed through the drain passage which goes to the direction lower part of a vertical on the horizontal outside of specification-part material. On the other hand, although the air current which acts on pin-like supporter material or specification-part material toward an outside arises according to the centrifugal force accompanying a substrate revolution, while interrupting the air current by the annular member, the course is made to change into a lower part side by drain passage, and resistance is given to an air current, and it can control that a turbulent flow occurs around pin-like supporter material or specification-part material.

[0008]

[Example] Next, the example of this invention is explained to details using a drawing. A substrate maintenance means 3 for whole outline drawing of longitudinal section in which drawing 1 shows the example of the rotating type substrate processor of this invention, and drawing 2 to lay the periphery edge of Substrate W at the upper bed of the axis of rotation 2 which the plan of an important section and drawing 3 are the perspective diagrams of an important section, and rotates by the circumference of the axis of the direction of a vertical by actuation of an electric motor 1, and to hold is really attached pivotable.

[0009] The perimeter of the substrate W held by the substrate maintenance means 3 and it at the horizontal position is covered from the 1st cup 4 of the bottom which can go up and down with a rise-and-fall drive (not shown), and the 2nd cup 5 above it.

[0010] The resist liquid supply nozzle 6 constituted movable covering the supply location equivalent to the center of rotation on Substrate W and the position in readiness distant from on Substrate W is formed in the outside of the 2nd cup 5, and resist liquid is supplied to the front face of Substrate W in a supply location, and it is constituted so that resist liquid can be applied to the front face of Substrate W by revolution of Substrate W. Moreover, the solvent supply nozzle 7 constituted movable covering the supply location which corresponds on the periphery edge of Substrate W, and the position in readiness distant from on Substrate W is formed in the outside of the 2nd cup 5, and a solvent is supplied to the periphery edge of the front face of Substrate W in a supply location, and it is constituted so that the resist liquid of a substrate periphery edge can be removed.

[0011] As shown in the expanded sectional view of the important section of drawing 4, the annular supporting material 10 attaches and the substrate maintenance means 3 is constituted by the bottom plate 8 really connected with the axis of rotation 2 pivotable so that the crevice for wastewater (for example, about 0.2mm) may be formed through a spacer 9.

[0012] A predetermined gap is separated to the hoop direction, and three pin-like supporter material 11 -- is prepared in the upper surface of supporting material 10, and it is constituted so that point contact may be carried out to the rear face of Substrate W and Substrate W may be supported.

[0013] Moreover, rather than pin-like supporter material 11 -- of the upper surface of supporting material 10, a predetermined gap is separated to the hoop direction, and, outside, six pin-like specification-part material 12 -- is prepared, and it is constituted so that point contact may be carried out to the periphery edge of the substrate W of the support condition by pin-like supporter material 11 -- and the horizontal location of Substrate W may be regulated. Two of specification-part material 12 -- predetermined are prepared so that point contact may be carried out to the periphery edge of the orientation flat OF of Substrate W and turning effort can be effectively transmitted to Substrate W. It may be cylindrical or tabular is [that what is necessary is just what is constituted as specification-part material 12 so that point contact can be carried out to the periphery edge of not only the shape of a pin but the substrate W] sufficient.

[0014] Said specification-part material 12 -- On a horizontal outside, the annular member 13 is formed so that the periphery edge of Substrate W may be covered over the perimeter. And the periphery edge of Substrate W and specification-part material 12 --, and the drain passage 14 that makes the drain

poured according to a centrifugal force from Substrate W between the inner skin of the annular member 13 and between the peripheral face of supporting material 10 and the inner skin of the annular member 13 go to the direction lower part of a vertical are formed.

[0015] The upper surface of the annular member 13 is constituted by the flat level surface, and the lower part of the annular member 13 is attached in a bottom plate 8 so that the crevice for drain blowdown may be formed through a spacer (not shown), and it is constituted so that resist liquid and the solvent which are poured through the drain passage 14 can be discharged outside. Moreover, it responds to the air current which goes to a between [the periphery edge of Substrate W, and the inner skin of the annular member 13] side according to a centrifugal force by the inner skin of the annular member 13 by the drain passage 14, and resistance is given to the flow, and it is constituted so that it can prevent sink and pin-like supporter material 11 -- and that a turbulent flow arises by specification-part material 12 -- along the flat upper surface of the annular member 13 in the condition that there is no turbulence of most air currents.

[0016] The axis of rotation 2 is constituted by tubed, the penetrant remover supply nozzle 15 is formed in the condition of penetrating a bottom plate 8 from the inside of the axis of rotation 2, a penetrant remover is supplied to the rear face of Substrate W, and it discharges outside through the crevice for drain blowdown from the crevice for wastewater, and it is constituted so that the rear face of Substrate W can be washed.

[0017] The pin insertion hole 16 is formed in three predetermined places of a bottom plate 8. A bottom plate 8 caudad Three substrate rise-and-fall pin 17 -- is prepared possible [rise and fall], and stops the substrate maintenance means 3 by a rotary encoder etc. in a predetermined location. It is made to go up and down substrate rise-and-fall pin 17 -- through the pin insertion hole 16 in the condition, and it consists of the processing locations and them which make pin-like supporter material 11 -- support Substrate W so that it may go up and down in an upper delivery location.

[0018].By the above configuration, when performing spreading and edge rinse of resist liquid, and rear-face washing, it prevents pin-like supporter material 11 -- and disturbing by specification-part material 12 -- for the air current produced in connection with the centrifugal force by revolution of Substrate W, and spreading homogeneity can be improved. Moreover, pin-like supporter material 11 -- and specification-part material 12 -- It can avoid that the remains of a chuck like [in order to carry out point contact to each and to hold Substrate W / in the case of being based on vacuum adsorption] are generated, and is **. Furthermore, resist liquid, a solvent, etc. can be discharged good through the drain passage 14, and the edge of Substrate W and cleanliness on the back can be made high.

[0019] Next, a comparison experimental result with equipment is explained the above-mentioned example equipment and conventionally. As equipment, the thing of a configuration of holding Substrate W by vacuum adsorption was used conventionally. It is resist liquid to the substrate W with a diameter of 6 inches. When applied to the thickness of 1.2 micrometers, thickness fluctuation was conventionally equivalent to equipment at 20-30A. Moreover, marks were also settled in less than 2mm from the edge of Substrate W with the wind by the turbulent flow. The detergency after edge rinse was also equivalent. On the other hand, according to example equipment, there are no remains of a chuck like equipment before. it adhered to the rear face although the number of particle of 0.2 micrometers or more was thousands of pieces with equipment conventionally when it did not perform rear-face washing -- comparing -- It decreases to about 200-300 pieces. When rear-face washing is performed, it is equipment conventionally. It was distinct that about 300 pieces decrease even below partly and can improve processing quality substantially.

[0020] The resist liquid supply nozzle 6, the above-mentioned solvent supply nozzle 7, and the above-mentioned penetrant remover supply nozzle 15 are carried out, and it is named a processing liquid supply means generically.

[0021] It is applicable not only to the circular substrate which has an orientation flat OF like the above-mentioned example as this invention but the rotating type substrate processor to square shape substrates, such as for [which have a notch / a circular substrate, for liquid crystal, etc.].

[0022]

[Effect of the Invention] Since according to the rotating type substrate processor of this invention point contact of the rear face of a substrate and the specification-part material is carried out for pin-like supporter material to the periphery edge of a substrate, respectively and a substrate is held so that clearly from the above explanation, it is avoidable to make a substrate rear face produce the remains of a chuck like [in the case of being based on the conventional vacuum adsorption]. Moreover, since the

upper surface of a wrap annular member is flat, it is mitigable that an air current occurs with the periphery edge of a substrate in the revolution on the outside of specification-part material. And while preventing remaining while processing liquid and the drain of a case of spreading liquid or edge rinse which are called a solvent had entered between the periphery edge of a substrate, and an annular member, and polluting the edge and the rear face of a substrate by the annular member and drain passage Without spoiling spreading homogeneity, since it controlled that gave resistance to the air current produced according to the centrifugal force accompanying a substrate revolution, and a turbulent flow occurred around pin-like supporter material or specification-part material, the cleanliness of the end face of a substrate or a rear face is raised, and processing quality could be improved.

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TECHNICAL FIELD

[Industrial Application] This invention applies spreading liquid, such as resist liquid, to substrates, such as a semiconductor wafer, a glass substrate for photo masks, a glass substrate for liquid crystal displays, and a substrate for optical disks, and supplies a solvent to the periphery edge of a substrate. It is related with the rotating type substrate processor equipped with a substrate maintenance means to hold a substrate and to rotate by the circumference of the axis of the direction of a vertical for washing, performing the so-called edge rinse, etc., and a processing liquid supply means to supply processing liquid to said substrate held at said substrate maintenance means.

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PRIOR ART

[Description of the Prior Art] As this kind of a rotating type substrate processor, conventionally, generally, it is constituted so that a substrate may be held by vacuum adsorption. However, it originated in that strong adsorption power, and the remains of a chuck remained in the substrate rear face, these remains of a chuck joined contamination from the before process, produced gap in the height on the front face of a substrate, and there was a problem which generates the focal abnormalities at the time of exposure. Moreover, when the particle adhering to the rear face of a substrate broke away and it held in a cassette, there was a problem of polluting the front face of the substrate held in the bottom, or having transferred to a substrate transport device and polluting other substrates.

[0003] Then, in order to avoid the above problems, what was constituted so that a substrate might be supported only on the periphery veranda is proposed, such as preparing the annular member which prepares the support pin which supports the rear face of a substrate, and the regulation pin which regulates a horizontal location in contact with the end face of a substrate in the periphery veranda of a substrate, or supports the periphery edge of a substrate with a bonnet over the perimeter.

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EFFECT OF THE INVENTION

[Effect of the Invention] Since according to the rotating type substrate processor of this invention point contact of the rear face of a substrate and the specification-part material is carried out for pin-like supporter material to the periphery edge of a substrate, respectively and a substrate is held so that clearly from the above explanation, it is avoidable to make a substrate rear face produce the remains of a chuck like [in the case of being based on the conventional vacuum adsorption]. Moreover, since the upper surface of a wrap annular member is flat, it is mitigable that an air current occurs with the periphery edge of a substrate in the revolution on the outside of specification-part material. and -- while preventing remaining while processing liquid and the drain of a case of spreading liquid or edge rinse which are called a solvent had entered between the periphery edge of a substrate, and an annular member, and polluting the edge and the rear face of a substrate by the annular member and drain passage Without spoiling spreading homogeneity, since it controlled that gave resistance to the air current produced according to the centrifugal force accompanying a substrate revolution, and a turbulent flow occurred around pin-like supporter material or specification-part material, the cleanliness of the end face of a substrate or a rear face is raised, and processing quality could be improved.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, when constituted from a support pin and a regulation pin, the turbulent flow occurred by the pin with the revolution, and there was a defect to which spreading homogeneity falls in the perimeter of a pin. although an annular member is prepared on the other hand -- a case -- spreading homogeneity -- excelling -- *** -- although -- the end face and rear face of a substrate -- dirt -- easy -- moreover, even if it washed them, a penetrant remover tended to remain, and there was a defect to which the cleanliness of the end face of a substrate or a rear face falls.

[0005] This invention aims at the ability to be made to make high cleanliness of the end face of a substrate, or a rear face, without spoiling spreading homogeneity, being made in view of such a situation and not making a substrate rear face produce the remains of a chuck.

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MEANS

[Means for Solving the Problem] A substrate maintenance means to hold a substrate and to rotate by the circumference of an axis of the direction of a vertical in order that this invention may attain the above objects, In a rotating type substrate processor which equipped a substrate held at the substrate maintenance means with a processing liquid supply means to supply processing liquid Pin-like supporter material which carries out point contact of the substrate to the rear face, and supports it to it for a substrate maintenance means, It has specification-part material which carries out point contact to the periphery edge of a substrate of a support condition by pin-like supporter material, and regulates a horizontal location of a substrate. And while having the flat upper surface, drain passage which makes a drain poured according to a centrifugal force from a wrap annular member and a substrate over the perimeter in a periphery edge of a substrate go to the direction lower part of a vertical has and consists of horizontal outsides of specification-part material.

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OPERATION

[Function] According to the configuration of the rotating type substrate processor of this invention, a substrate can be held and rotated by carrying out point contact of the rear face of a substrate, and the specification-part material for pin-like supporter material to the periphery edge of a substrate, respectively. And although a bonnet, and processing liquid and the drain of a case of spreading liquid or edge rinse which are called a solvent enter the periphery edge of a substrate between the periphery edge of a substrate, and an annular member over the perimeter in the annular member which made the upper surface flat, they can be passed through the drain passage which goes to the direction lower part of a vertical on the horizontal outside of specification-part material. On the other hand, although the air current which acts on pin-like supporter material or specification-part material toward an outside arises according to the centrifugal force accompanying a substrate revolution, while interrupting the air current by the annular member, the course is made to change into a lower part side by drain passage, and resistance is given to an air current, and it can control that a turbulent flow occurs around pin-like supporter material or specification-part material.

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EXAMPLE

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[0009] The perimeter of the substrate W held by the substrate maintenance means 3 and it at the horizontal position is covered from the 1st cup 4 of the bottom which can go up and down with a rise-and-fall drive (not shown), and the 2nd cup 5 above it.

[0010] The resist liquid supply nozzle 6 constituted movable covering the supply location equivalent to the center of rotation on Substrate W and the position in readiness distant from on Substrate W is formed in the outside of the 2nd cup 5, and resist liquid is supplied to the front face of Substrate W in a supply location, and it is constituted so that resist liquid can be applied to the front face of Substrate W by revolution of Substrate W. Moreover, the solvent supply nozzle 7 constituted movable covering the supply location which corresponds on the periphery edge of Substrate W, and the position in readiness distant from on Substrate W is formed in the outside of the 2nd cup 5, and a solvent is supplied to the periphery edge of the front face of Substrate W in a supply location, and it is constituted so that the resist liquid of a substrate periphery edge can be removed.

[0011] As shown in the expanded sectional view of the important section of drawing 4, the annular supporting material 10 attaches and the substrate maintenance means 3 is constituted by the bottom plate 8 really connected with the axis of rotation 2 pivotable so that the crevice for wastewater (for example, about 0.2mm) may be formed through a spacer 9.

[0012] A predetermined gap is separated to the hoop direction, and three pin-like supporter material 11 -- is prepared in the upper surface of supporting material 10, and it is constituted so that point contact may be carried out to the rear face of Substrate W and Substrate W may be supported.

[0013] Moreover, rather than pin-like supporter material 11 -- of the upper surface of supporting material 10, a predetermined gap is separated to the hoop direction, and, outside, six pin-like specification-part material 12 -- is prepared, and it is constituted so that point contact may be carried out to the periphery edge of the substrate W of the support condition by pin-like supporter material 11 -- and the horizontal location of Substrate W may be regulated. Two of specification-part material 12 -- predetermined are prepared so that point contact may be carried out to the periphery edge of the orientation flat OF of Substrate W and turning effort can be effectively transmitted to Substrate W. It may be cylindrical or tabular is [that what is necessary is just what is constituted as specification-part material 12 so that point contact can be carried out to the periphery edge of not only the shape of a pin but the substrate W] sufficient.

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[0015] The upper surface of the annular member 13 is constituted by the flat level surface, and the lower part of the annular member 13 is attached in a bottom plate 8 so that the crevice for drain

blowdown may be formed through a spacer (not shown), and it is constituted so that resist liquid and the solvent which are poured through the drain passage 14 can be discharged outside. Moreover, it responds to the air current which goes to a between [the periphery edge of Substrate W, and the inner skin of the annular member 13] side according to a centrifugal force by the inner skin of the annular member 13 by the drain passage 14, and resistance is given to the flow, and it is constituted so that it can prevent sink and pin-like supporter material 11 -- and that a turbulent flow arises by specification-part material 12 -- along the flat upper surface of the annular member 13 in the condition that there is no turbulence of most air currents.

[0016] The axis of rotation 2 is constituted by tubed, the penetrant remover supply nozzle 15 is formed in the condition of penetrating a bottom plate 8 from the inside of the axis of rotation 2, a penetrant remover is supplied to the rear face of Substrate W, and it discharges outside through the crevice for drain blowdown from the crevice for wastewater, and it is constituted so that the rear face of Substrate W can be washed.

[0017] The pin insertion hole 16 is formed in three predetermined places of a bottom plate 8. A bottom plate 8 caudad Three substrate rise-and-fall pin 17 -- is prepared possible [rise and fall], and stops the substrate maintenance means 3 by a rotary encoder etc. in a predetermined location. It is made to go up and down substrate rise-and-fall pin 17 -- through the pin insertion hole 16 in the condition, and it consists of the processing locations and them which make pin-like supporter material 11 -- support Substrate W so that it may go up and down in an upper delivery location.

[0018] By the above configuration, when performing spreading and edge rinse of resist liquid, and rear-face washing, it prevents pin-like supporter material 11 -- and disturbing by specification-part material 12 -- for the air current produced in connection with the centrifugal force by revolution of Substrate W, and spreading homogeneity can be improved. Moreover, pin-like supporter material 11 -- and specification-part material 12 -- It can avoid that the remains of a chuck like [in order to carry out point contact to each and to hold Substrate W / in the case of being based on vacuum adsorption] are generated, and is **. Furthermore, resist liquid, a solvent, etc. can be discharged good through the drain passage 14, and the edge of Substrate W and cleanliness on the back can be made high.

[0019] Next, a comparison experimental result with equipment is explained the above-mentioned example equipment and conventionally. As equipment, the thing of a configuration of holding Substrate W by vacuum adsorption was used conventionally. It is resist liquid to the substrate W with a diameter of 6 inches. When applied to the thickness of 1.2 micrometers, thickness fluctuation was conventionally equivalent to equipment at 20-30A. Moreover, marks were also settled in less than 2mm from the edge of Substrate W with the wind by the turbulent flow. The detergency after edge rinse was also equivalent. On the other hand, according to example equipment, there are no remains of a chuck like equipment before. it adhered to the rear face although the number of particle of 0.2 micrometers or more was thousands of pieces with equipment conventionally when it did not perform rear-face washing -- comparing -- It decreases to about 200-300 pieces. When rear-face washing is performed, it is equipment conventionally. It was distinct that about 300 pieces decrease even below partly and can improve processing quality substantially.

[0020] The resist liquid supply nozzle 6, the above-mentioned solvent supply nozzle 7, and the above-mentioned penetrant remover supply nozzle 15 are carried out, and it is named a processing liquid supply means generically.

[0021] It is applicable not only to the circular substrate which has an orientation flat OF like the above-mentioned example as this invention but the rotating type substrate processor to square shape substrates, such as for [which have a notch / a circular substrate, for liquid crystal, etc.].

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is whole outline drawing of longitudinal section showing the example of the rotating type substrate processor of this invention.

[Drawing 2] It is the plan of an important section.

[Drawing 3] It is the perspective diagram of an important section.

[Drawing 4] It is the expanded sectional view of an important section.

[Description of Notations]

3 -- Substrate maintenance means

6 -- Resist liquid supply nozzle

7 -- Solvent supply nozzle

11 -- Pin-like supporter material

12 -- Specification-part material

13 -- Annular member

14 -- Drain passage

15 -- Penetrant remover supply nozzle

W -- Substrate

[Translation done.]

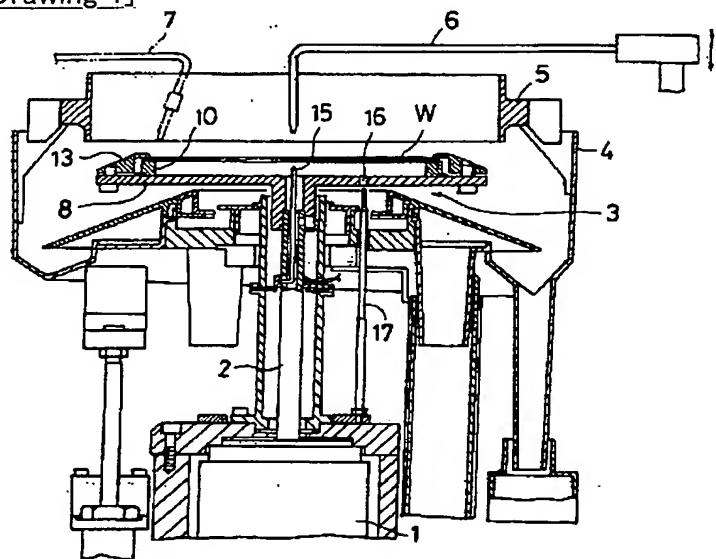
* NOTICES *

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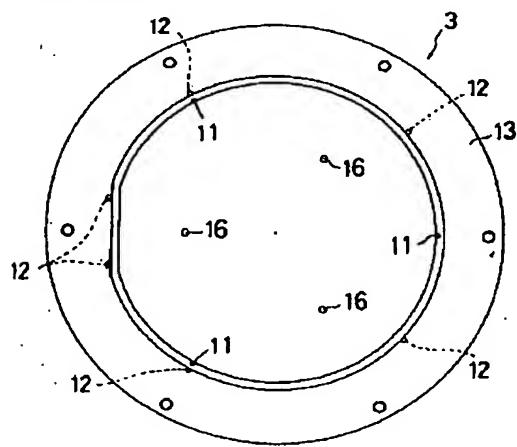
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DRAWINGS

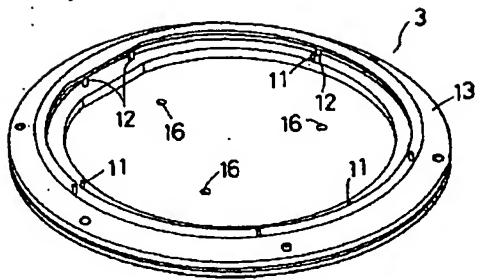
[Drawing 1]



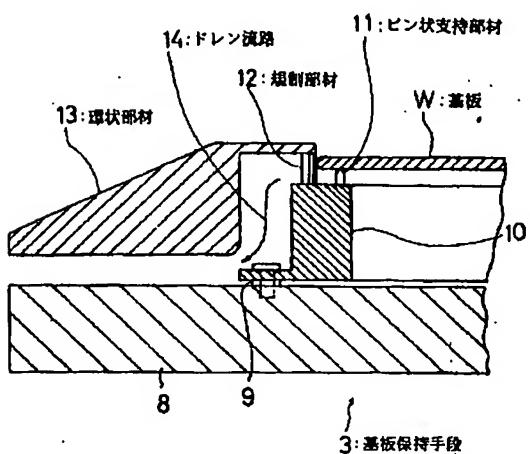
[Drawing 2]



[Drawing 3]



[Drawing 4]



[Translation done.]